This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) ~~An apparatus~~ A wafer engine for moving semiconductor workpieces ~~wafers and related substrate objects~~, comprising:

a linear drive assembly having a carriage, said linear drive assembly for moving said carriage between a first and second position along a first linear path, said first linear path defining an x-axis;

a base mounted to said carriage; ~~a linear drive having linear motion along an x axis;~~

a rotational drive housed within said base ~~extending from and mounted to said linear drive, for rotating~~ having a support column that extends out of said base, said rotational drive adapted to rotate said support column about a longitudinal central axis of said support column, said longitudinal central axis defining ~~about~~ a theta axis;

a z-axis drive housing having a base portion and an elongated body, said base portion mounted to said support column such that said rotational drive rotates said z-axis drive housing about said theta axis; ~~linear drive extending from and mounted to said rotational drive having linear motion along a z axis, said z axis being offset from and substantially parallel to said theta axis; and~~

a z-axis drive assembly housed substantially within said elongated body, said z-axis drive assembly adapted to move between a first and second position along a second linear path, said second linear path defining a z-axis; and

a radial drive housing ~~extending from and~~ mounted to said z-axis ~~linear~~ drive assembly, said radial drive housing enclosing a radial drive assembly adapted to move an end effector between a first position and second position along a third linear path, said third linear path defining a radial axis.

2. (Cancel)

3. (Currently Amended) The ~~apparatus~~ wafer engine as recited in claim 2, wherein ~~said radial axis rotates around said theta axis when~~ said rotational drive simultaneously rotates said z-axis drive housing and said radial drive housing about said theta axis.

4. (Currently Amended) The ~~apparatus~~ wafer engine as recited in claim 1, wherein said base ~~apparatus~~ further includes an ~~airflow unit~~ exhaust device ~~mounted to said rotational drive~~.

5. (Currently Amended) The ~~apparatus~~ wafer engine as recited in claim 4, wherein said ~~airflow unit~~ exhaust device is for drawing air ~~reduces the pressure~~ within said z-axis ~~linear~~ drive housing though said base portion and said support column and venting the air out of said base. ~~to prevent particles created by said z axis linear drive from contaminating a wafer supported by said end effector.~~

6. (Currently Amended) The ~~apparatus~~ wafer engine as recited in claim 1, wherein said radial drive housing is removably mounted to said z-axis ~~linear~~ drive assembly.

7. (Currently Amended) The ~~apparatus~~ wafer engine as recited in claim 6, wherein said radial drive housing includes at least one component selected from the group consisting of (i) an ID reader, (ii) a metrology tool, (iii) an aligner, (iv) a notch detector, (v) an edge detector, (vi) a wafer marking tool, (vii) a processing module, (viii) a wafer viewing, and (ix) an environmental control device.

8. (Currently Amended) The ~~apparatus~~ wafer engine as recited in claim 1, ~~wherein~~ further including a fan/filter unit ~~is~~ mounted to said radial drive housing, said fan/filter unit for drawing air into said radial drive housing and filtering the air before venting the air out of said radial drive housing. ~~is adapted to prevent particles created by said radial drive from contaminating a wafer supported by said end effector.~~

9.-10. (Cancel)

11. (Currently Amended) A wafer engine for transporting semiconductor wafers ~~and related substrate objects~~, comprising:

a ~~linear~~ first drive assembly ~~having~~ providing ~~linear~~ motion between a first and second position along a first linear path, said first linear path defining ~~along~~ an x-axis;

a base mounted to said first drive assembly, said base having a bore;

a rotational drive seated within said bore ~~extending from and mounted to said linear drive~~, said rotational drive adapted to rotate about a longitudinal central axis of said rotational drive, said longitudinal central axis defining ~~for rotating about~~ a theta-axis;

a z-axis ~~linear~~ drive housing having an elongated vertical body and a base portion extending substantially perpendicular from said elongated vertical body, said z-axis drive housing containing a z-axis drive assembly adapted to move within said elongated vertical body along a second linear path, said second linear path defining a z-axis ~~located above and mounted to said rotational drive, having linear motion along a z axis, said z-axis being~~ that is offset from and substantially parallel to said theta-axis;

a support column secured to said base portion and said rotational drive, said support column adapted to rotate about said theta-axis;

a radial drive housing ~~extending from and~~ removably mounted to said z-axis ~~linear~~ drive assembly, said radial drive housing containing a radial drive assembly adapted to move between a first and second position within said radial drive housing along a third linear path, said linear path defining a radial axis; ~~including at least one end effector having linear motion along a radial axis;~~ and

an end effector mounted to said radial drive assembly.

~~said theta-axis extends through said radial drive such that said theta-axis and the center of said radial drive are offset.~~

12. (Cancel)

13. (Currently Amended) The wafer engine as recited in claim 11, wherein said radial drive housing includes at least one component selected from the group consisting of (i)

an ID reader, (ii) a metrology tool, (iii) an aligner, (iv) a notch detector, (v) an edge detector, and (vi) a wafer marking tool.

14. (Cancel)

15. (Currently Amended) A ~~system~~ wafer engine for handling semiconductor wafers ~~and related substrate objects within a confined workspace~~, comprising:

means for providing linear motion between a first position and a second position;

a slide body ~~housing~~ substantially enclosing said means for providing linear motion between said first position and said second position;

an end effector mounted to said means for providing linear motion between said first position and said second position, said end effector adapted to support a semiconductor wafer seated on said end effector in a substantially horizontal orientation;

means for moving said ~~housing~~ slide body between a third and fourth position along a vertical linear path, said vertical linear path defining a z-axis; ~~linearly in a z direction, and for rotating said housing about a theta axis; and~~

means for simultaneously rotating said slide body and said means for moving said slide body between a third and fourth position about a theta axis;

a fan/filter device mounted to ~~device for reducing air pressure inside~~ said slide body, said fan/filter device for drawing air into said slide body and filtering the air prior to venting the air out of said slide body. ~~housing such that articles created by said housing does not contaminate the wafer support by said ends effector~~.

16-18. (Cancel)

19. (New) A wafer engine for moving semiconductor workpieces, comprising:

a linear drive assembly having a carriage, said linear drive assembly for moving said carriage between a first and second position along a first linear path, said first linear path defining an x-axis;

a base mounted to said carriage;

a rotational drive housed within said base having a support column that extends out of said base, said rotational drive adapted to rotate said support column about a longitudinal central axis of said support column, said longitudinal central axis defining a theta axis;

a z-axis drive housing having a base portion and an elongated body, said base portion mounted to said support column;

a z-axis drive assembly housed substantially within said elongated body, said z-axis drive assembly adapted to move between a first and second position along a second linear path, said second linear path defining a z-axis;

a radial drive housing mounted to said z-axis drive assembly, said radial drive housing enclosing a radial drive assembly adapted to an object between a first position and second position along a third linear path, said third linear path defining a radial axis;

an exhaust vent mounted to said base for drawing air located within said z-axis drive housing through said support column and out said exhaust vent; and

a fan/filter unit mounted to said radial drive housing, said fan/filter unit for drawing air into said radial drive housing and filtering the air before venting the air out of said radial drive housing.

20. (New) The wafer engine according to claim 19, wherein said rotational drive simultaneously rotates said z-axis drive housing and said radial drive housing about said theta axis.

21. (New) The wafer engine according to claim 19, wherein said theta axis is substantially parallel to said z-axis.

22. (New) The wafer engine according to claim 19, wherein said object comprises an end effector.

23. (New) The wafer engine according to claim 19, wherein said object comprises a first end effector and a second end effector.

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